

ACCESSION #: 9606240235

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Edwin I. Hatch Nuclear Plant - Unit 1 PAGE: 1 OF 4

DOCKET NUMBER: 05000321

TITLE: Component Failure Results in Manual Reactor Shutdown

EVENT DATE: 05/26/96 LER #: 96-009-00 REPORT DATE: 06/19/96

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 018

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Steven B. Tipps, Nuclear Safety and

Compliance Manager, Hatch TELEPHONE: (912) 367-7851

COMPONENT FAILURE DESCRIPTION:

CAUSE: X SYSTEM: SJ COMPONENT: ECBD MANUFACTURER: G080

REPORTABLE NPRDS: Yes

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 0517 EDT on 5/26/96, Unit 1 was in the Run mode at a power level of 460 CMWT (18 percent rated thermal power). The main turbine had previously been removed from service to allow repair of a leaking hydraulic control line. At that time, Control Room operators received annunciators indicating that both reactor feed pumps had automatically tripped. Reactor water level began decreasing and licensed operators attempted unsuccessfully to restart one of the tripped feed pumps. When it became apparent that the water level decrease could not be reversed, operators inserted a manual reactor shutdown signal in anticipation of receiving an automatic reactor shutdown signal on low reactor water level. Prior to water level reaching the setpoint for automatic

initiation of the High Pressure Coolant Injection (HPCI) system, operators manually started the Reactor Core Isolation Cooling (RCIC) system to restore water level. Water level began increasing after reaching a minimum of 30 inches below instrument zero (128.4 inches above the top of the active fuel). Pressure was controlled by the bypass valves and water level was controlled by the RCIC and Control Rod Drive systems. The cause of this event was a component failure. A failed electronic circuit board in the reactor feed pump turbine monitoring system resulted in automatic shutdown of both reactor feed pump turbines. An inadequate logic system design was a contributing factor to the event. Corrective actions for this event include: 1) replacement of the failed component; and 2) modification of the system design during upcoming refueling outages currently scheduled for Fall 1997 (Unit 1) and Spring 1997 (Unit 2).

TEXT PAGE 2 OF 4

TEXT PAGE 2 OF 4

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor

Energy Industry Identification System codes appear in the text as (EIIIS Code XX).

DESCRIPTION OF EVENT

At 0517 EDT on 5/26/96, Unit 1 was in the Run mode at a power level of percent rated thermal power). The main generator (EIIIS Code TB) was off line and the main turbine (EIIIS Code TA) had previously been removed from service to allow repair of a leaking hydraulic control line. At that time, Control Room operators received annunciators indicating that both reactor feed pumps (EIIIS Code SJ) had automatically tripped. Since the main turbine was not operating, the main turbine bypass valves (EIIIS Code SO) were already open and were controlling reactor pressure. Loss of feedwater flow and the sustained steam flow through the bypass valves resulted in decreasing reactor water level. Licensed personnel attempted, without success, to restart the feed pumps. Reactor water

level continued to decrease. Prior to water level reaching the automatic reactor shutdown setpoint of 3 inches above instrument zero, licensed operators conservatively elected to shut down the reactor manually. All control rods inserted as required.

After the reactor was shut down, water level continued to decrease due to the action of the bypass valves controlling reactor pressure. When reactor water level reached 3 inches above instrument zero (approximately 161 inches above the top of active fuel) an automatic reactor shutdown signal was received as designed and the Group 2 Primary Containment Isolation System (PCIS, EIIS Code JM) valves received automatic closure signals as designed. Since the reactor had already been shut down manually, no further control rod movement occurred as a result of the automatic reactor shutdown signal. All Group 2 PCIS valves responded as designed and this was confirmed by licensed operators per procedure. Prior to the water level reaching the setpoint for automatic initiation of the Reactor Core Isolation Cooling (RCIC, EIIS Code BN) and High Pressure Coolant Injection (HPCI, EIIS Code BJ) systems, licensed operators conservatively elected to initiate the RCIC system manually to restore reactor water level. The RCIC system injected to the vessel as designed, reversing the decrease in reactor water level at a minimum of 30 inches below instrument zero (approximately 128 inches above the top of the active fuel). Reactor water level was restored to 57 inches above instrument zero (approximately 215 inches above the top of active fuel)

whereupon licensed personnel secured the RCIC system manually, and reactor water level was maintained thereafter by the Control Rod Drive (CRD, EIIS Code AA) system. Reactor pressure was controlled throughout this event by the operation of the main turbine bypass valves. No safety/relief valves lifted or were required to lift.

TEXT PAGE 3 OF 4

CAUSE OF EVENT

The cause of this event was component failure. The failure of an electronic circuit board in the feed pump turbine protection logic resulted in turbine axial misposition signals (which normally indicates excessive turbine thrust bearing wear) being generated simultaneously in both reactor feed pump turbine automatic shutdown logic systems. This resulted in both feed pump turbines being shut down automatically. The circuit board was sent to the manufacturer for analysis. The manufacturer determined that a capacitor had shorted in the circuit board, and the short resulted in damage to the power supply for the monitoring circuits.

Less than adequate design contributed to this event in that the feed pump turbine protection logic was not intended to be vulnerable to a failure of the affected circuit board.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This report is required by 10 CFR 50.73(a)(2)(iv) because licensed plant operators manually shut down the reactor in anticipation of receiving an

automatic shutdown signal on low reactor water level. This report is required also because a Group 2 PCIS isolation signal was received on low reactor water level, which is an unplanned actuation of an engineered safety feature.

The Reactor Protection System (RPS) is designed to protect the principal safety barriers, including the fuel cladding and reactor coolant pressure boundary, by rapidly inserting all the control rods when process conditions require it. These process conditions include high reactor pressure, high reactor power, low reactor water level, and others. The RPS can also be actuated manually.

PCIS valves are designed to limit the release of radioactive material to the environment in the event of an accident by automatically isolating the lines entering and leaving the Primary Containment (EIIS Code NH).

In this event, the RPS and the PCIS functioned as designed given the plant conditions resulting from the automatic shutdown of the reactor feed pumps and the ensuing decrease in reactor water level. Had a design basis accident occurred in conjunction with this event, the plant would have responded as designed and assumed in the Final Safety Analysis Report. Based on the foregoing discussion, it is concluded that this event did not adversely affect nuclear safety. The analysis applies to all operating conditions.

TEXT PAGE 4 OF 4

CORRECTIVE ACTIONS

1. The failed circuit board was replaced. This action is complete.
2. The vulnerability of the feed pump turbine protection logic to a single failure of the circuit board will be addressed by a design change. This action will be implemented on both units and will be completed during the next refueling outage for each unit, currently scheduled for Fall 1997 (Unit 1) and Spring 1997 (Unit 2).

ADDITIONAL INFORMATION

1. Other Systems Affected, No systems other than those already mentioned in this report were affected by this event.

2. Failed Components Information

Master Parts List Number: 1N21-C005A/B EIIS System Code: JK

Type: Circuit Board EIIS Component Code: ECBD

Manufacturer: General Electric Root Cause Code: X

Model Number: DS200TBQDG1ACC Reportable to NPRDS: Yes

Manufacturer Code: G080

3. Previous Similar Events: There have been no events reported in the past two years in which a single component failure resulted in an automatic shutdown of the reactor.

ATTACHMENT 1 TO 9606240235 PAGE 1 OF 1 ATTACHMENT 1 TO 9606240235
PAGE 1 OF 1

Georgia Power Company

40 Inverness Center Parkway

Post Office Box 1295

Birmingham, Alabama 35201

Telephone 205 877-7279

J. T. Beckham, Jr. Georgia Power

Vice President-Nuclear the southern electric system

Hatch Project

June 19, 1996

Docket No. 50-321 HL-5194

U.S. Nuclear Regulatory Commission

ATTN: Document Control Desk

Washington, D.C. 20555

Edwin I. Hatch Nuclear Plant - Unit 1

Licensee Event Report

Component Failure Results in Manual Reactor Shutdown

Gentlemen:

In accordance with the requirements of 10 CFR 50.73(a)(2)(iv), Georgia Power Company is submitting the enclosed Licensee Event Report (LER) concerning a component failure which resulted in a manual reactor shutdown.

Sincerely,

J. T. Beckham, Jr.

SMS/eb

Enclosure: LER 50-321/1996-009

cc: Georgia Power Company

Mr. H. L. Sumner, General Manager - Nuclear Plant

NORMS

U. S. Nuclear Regulatory Commission, Washington, D. C.

Mr. K. Jabbour, Licensing Project Manager - Hatch

U.S. Nuclear Regulatory Commission, Region II

Mr. S. D. Ebnetter, Regional Administrator

Mr. B. L. Holbrook, Senior Resident Inspector - Hatch

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